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codebash

OCR GCSE (9-1) Computer Science J277

Misconception Catalogue

Version 1.1 | November 2026 | 71 misconceptions

These are the errors that cost GCSE students marks, each paired with the correct idea, how it shows up in written answers, and a quick classroom fix. 45 entries come directly from OCR examiners' reports on live papers and cite the question they relate to. The rest come from CodeBash's own question setting and marking, and are labelled "Setter experience" so you can tell the two apart.

How to use it

Teachers: use the codes to plan reteach lessons, or pair the catalogue with the CodeBash diagnostic mocks, where every wrong option maps to one code and the marksheet shows which misconceptions your class holds.

Students: read the Misconception column and ask yourself honestly whether you do this. If you do, read the Correct idea and try the Quick fix.

Codes: P2 = J277/02 Computational thinking, algorithms and programming. P1 = J277/01 Computer systems. Spec = OCR J277 specification reference.

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J277/02 Computational thinking, algorithms and programming

Code	Spec	Misconception	Correct idea	Shows up as	Quick fix	Evidence
P2-01	2.3.2	Defines a syntax error by giving an example ("a missing bracket") instead of saying what it is	A syntax error breaks the rules (grammar) of the language, so the code cannot be translated or run	Definition answers that are only an example	Teach the definition and the example as two separate sentences	OCR ER J277/02 June 2024, Q3(a)
P2-02	2.3.2	Confuses a variable name with a string literal: thinks an unquoted variable is an error, or that it outputs its own name	temp could be a variable, so print(temp) may be valid; it is only an error if temp is undefined	Lists a missing-quotes example that is legal code	Contrast print(temp) and print("temp") with temp defined and undefined	OCR ER J277/02 June 2024, Q3(a)
P2-03	2.2.1	Writes a compound condition with the second operand missing: if total >= 10 and <= 20	Each comparison needs both sides: if total >= 10 and total <= 20	Range checks that repeat the operator but not the variable	Read each side of AND / OR aloud as a full question	OCR ER J277/02 June 2024, Q3(b) and Q9(c)(i)
P2-04	2.1.2	Draws flowchart decisions with missing or unlabelled exits, or leaves paths unconnected	Every decision branch is labelled and every path reaches Stop	Diamonds with two unlabelled arrows; dead-end paths	Checklist: every diamond has two labelled exits; trace every path to Stop	OCR ER J277/02 June 2024, Q2
P2-05	2.1.2	Names inputs and outputs vaguely ("video" instead of "name of video")	Inputs and outputs are specific data items the program receives or produces	Inputs that are objects or actions, not data	Ask: what exactly would the user type or see?	OCR ER J277/02 June 2024, Q4(a)
P2-06	2.4.1	Draws a NOT gate without the circle, or gives a gate the wrong number of inputs	NOT is a triangle with a circle and one input; AND / OR take two inputs at GCSE	Triangles without circles; three wires into one AND	Gate-drawing drill with a symbol checklist	OCR ER J277/02 June 2024, Q5(b)
P2-07	2.2.3	Can use .upper and .left but not when combined with casting	Functions can be nested; work inside out, casting where a number meets text	Correct single operations, wrong combined ones	Trace nested expressions inside out on mini whiteboards	OCR ER J277/02 June 2024, Q6(a)
P2-08	2.2.3	Uses a comma to concatenate strings (print style)	Concatenation uses +; a comma only separates print arguments	message = word1, word2	Show that message = a, b makes a tuple / list in Python, not one string	OCR ER J277/02 June 2024, Q6(b)
P2-09	2.2.1	Prints a result when the question says to store it in a variable	Store means assign to the named variable; output is a separate step	print(word1 + word2) instead of message = word1 + word2	Highlight the command word (store / output / return) before writing	OCR ER J277/02 June 2024, Q6(b)
P2-10	2.2.1	Changes the variable names given in the question or puts spaces in names	Identifiers must match the question exactly and cannot contain spaces	word 1, wordone, world1 for word1	Copy given names letter for letter; underline them in the question	OCR ER J277/02 June 2024, Q6(b) and overview
P2-11	2.5.1	Describes how high- and low-level languages or translators differ when asked for reasons or benefits	Answer the command word: a reason for using low-level code, or a benefit of compiling	Definitions instead of reasons	Sentence starter: "It would be used because…"	OCR ER J277/02 June 2024, Q7
P2-12	2.3.1	Gives generic maintainability points, including ones the code already has (e.g. indentation)	Improvements must apply to the code shown and not already be present	"Add indentation" to indented code; no reference to the code	Annotate the given code before suggesting improvements	OCR ER J277/02 June 2024, Q8(a)
P2-13	2.3.1	Confuses maintainability with testing	Maintainability is how easy code is to read and change (names, comments, indentation, sub programs)	Test data offered as a maintainability improvement	Sort cards: maintainability vs testing vs validation	OCR ER J277/02 June 2024, overview

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P2-14	2.2.3	Overwrites a function's parameters with input()	Parameters already hold the values passed in; do not ask the user again	def move(direction, position): direction = input()	Call the function in a test harness so input() visibly breaks it	OCR ER J277/02 June 2024, Q8(b) and overview
P2-15	2.2.3	Does not use the loop counter as the array index when searching an array	Inside for i = 0 to n-1, the current item is array[i]	Compares the whole array, or uses 2D indexing on a 1D array	Trace table with i and array[i] as separate columns	OCR ER J277/02 June 2024, Q9(a)(ii)
P2-16	2.2.1	Off-by-one loop bounds, mixing Python range() with ERL for	ERL for i = 0 to 5 includes 5; Python range(0, 5) stops at 4	Loops that miss the last item or go one past the end	Write both forms side by side and trace the final value	OCR ER J277/02 June 2024, Q9(a)(ii)
P2-17	2.1.2	Trace tables: writes x or a dash when there is no output, wrong line numbers, extra outputs	Leave a cell blank when nothing is output; one row per change	Ambiguous symbols in the output column	Model a trace table with a 'leave blank' rule	OCR ER J277/02 June 2024, Q9(b)
P2-18	2.3.2	Gets inclusive boundaries wrong (> instead of >=)	Valid 40 to 80 inclusive means >= 40 and <= 80	Boundary values rejected	Always test the boundary value itself in a trace	OCR ER J277/02 June 2024, Q9(c)(i)
P2-19	2.2.1	Uses maths symbols (≥ ≤) or reversed operators (=>)	Code uses >= and <=, in that order	≥ in Section B code	Operator flash cards: keyboard form only	OCR ER J277/02 June 2024, Q9(c)(i)
P2-20	2.2.3	SQL: misspells table or field names, adds spaces, misuses WHERE	Names must match the table exactly; WHERE filters rows	FROM TblResults when TblResult is given	Copy names from the table; build queries clause by clause	OCR ER J277/02 June 2024, Q9(d)
P2-21	2.1.1	Gives textbook definitions of abstraction or decomposition with no link to the scenario, or confuses the two	Say what is removed / focused on, or how this program would be split up	Definitions with no reference to the context	Every answer names something from the scenario	OCR ER J277/02 June 2024, Q9(e)
P2-22	2.2.1	Builds over-complicated solutions (extra arrays) where a running total or highest-so-far works	Keep it simple: a variable updated inside the loop	Logic slips in unnecessary array code	Teach the running-total and highest-so-far patterns explicitly	OCR ER J277/02 June 2024, Q9(f)
P2-23	2.2.1	Uses for x in list and then list[x]	In for x in list, x is the item, not the index	names[name] after for name in names	Trace for x in list and for i in range(len(list)) side by side	OCR ER J277/02 June 2024, Q9(f)
P2-24	2.2.1	Confuses = (assignment) with == (comparison)	= stores a value; == compares two values	if score = 10 then	Read = as 'becomes' and == as 'is equal to'	Setter experience
P2-25	2.2.2	Joins a number to a string without casting	Cast with str() before concatenating	print("Total: " + total) with a real total	Predict-then-run: show the type error	Setter experience
P2-26	2.2.2	Forgets that input() returns a string	Cast with int() or float() before doing arithmetic	seats * 8 where seats came straight from input()	Show "3" * 8 in Python	Setter experience
P2-27	2.2.1	Confuses DIV, MOD and /	DIV is whole-number division, MOD is the remainder, / gives a real	17 MOD 5 = 3.4	Table of 17 / 5, 17 DIV 5, 17 MOD 5	Setter experience
P2-28	2.3.1	Uses AND and OR the wrong way round in range checks, whether accepting or rejecting values	A value is invalid if it is too low OR too high; it is valid if it is at least the minimum AND at most the maximum	while x < 1 AND x > 8	Number line: can one value be below 1 and above 8?	Setter experience
P2-29	2.1.3	Uses binary search on an unsorted list	Binary search needs sorted data	Recommends binary search for unsorted data	Show a binary search failing on an unsorted list	Setter experience

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P2-30	2.1.3	Merge sort answers show only splitting, or merge without ordering	Split to single items, then merge pairs in order, repeatedly	Splits correctly, then lists in the original order	Card sort physically: split, then merge	Setter experience
P2-31	2.1.3	Gives the result of more or fewer passes than asked for in a bubble sort, e.g. the fully sorted list for one pass	One pass moves the largest item to the end only	Sorted list for 'after the first pass'	Trace one pass with swaps marked	Setter experience
P2-32	2.2.3	Puts return inside the loop	Return after the loop, once the whole array has been processed	Function returns after the first item	Trace a 3-item array through the function	Setter experience
P2-33	2.2.3	Initialises a total or count inside the loop	Initialise before the loop so it is not reset each time	total = 0 on the line after for	Trace: watch total reset each iteration	Setter experience
P2-34	2.2.3	File handling: forgets to close, or opens in write mode when appending (Python)	Open, process, close; append mode keeps existing data	Missing close(); 'w' erasing a log	Open-read/write-close template	Setter experience
P2-35	2.2.3	Reverses 2D array indices	array[row, column] in the order the question defines	climbs[day, wall] when defined as [wall, day]	Label the grid with the index order before coding	Setter experience
P2-36	2.2.3	Prints inside a function instead of returning	A function returns a value to the caller	print(total) at the end of a function	Use the returned value in a second calculation	Setter experience
P2-37	2.2.3	Misunderstands local and global scope, e.g. uses a local variable outside its sub program	A local variable exists only inside the sub program where it is declared	Uses total after calling the function	Run code that reads a local variable outside its function	Setter experience
P2-38	2.4.1	Ignores brackets / precedence: treats NOT (A OR B) as NOT A OR B	Brackets change the result; evaluate inside the brackets first	Truth table rows wrong where A or B is 1	Truth tables with intermediate columns	Setter experience
P2-39	2.3.2	Confuses the types of test data (normal, boundary, invalid, erroneous)	Invalid: right data type, outside the range. Erroneous: wrong data type	"fast" labelled invalid; 75 labelled erroneous	Sort test data into the four types	Setter experience
P2-40	2.5.1	Thinks an interpreter produces an executable, or a compiler translates line by line	A compiler translates the whole program into an executable; an interpreter translates and runs one line at a time	Swapped characteristics	Two-column comparison table, practised both ways	Setter experience

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J277/01 Computer systems

Code	Spec	Misconception	Correct idea	Shows up as	Quick fix	Evidence
P1-01	1.2.4	Thinks more bits per sample gives a smaller range of amplitudes	More bits per sample means more possible amplitude values, so more accurate sound	"Smaller" in a gap-fill about bit depth	Show 2-bit vs 4-bit sampling of the same wave	OCR ER J277/01 June 2025, Q1(a)
P1-02	1.2.4	Defines a pixel as a square with many colours, a bit of data, or a square on the screen	A pixel is the smallest element of an image and holds one colour at a time	Pixel described as containing several colours	Zoom into an image until single colours show	OCR ER J277/01 June 2025, Q1(b)(i)
P1-03	1.2.3	Calculates the size of one file when the question asks for several	Multiply by the number of files where asked	Right size for one image, missing x10	Underline every quantity in the question before calculating	OCR ER J277/01 June 2025, Q1(b)(ii)
P1-04	1.2.4	Gives the number of colours (2^n, 256) instead of the number of bits	Bits needed: the smallest n where 2^n covers the colours	Answers of 256 or 2^8 for a bits question	Ask 'bits or colours?' before answering	OCR ER J277/01 June 2025, Q1(b)(iii)
P1-05	1.2.2	Justifies storage with "faster" without saying faster at what, or without linking to the scenario	Say faster read / write speed and why it matters for this use	Characteristic named with no link to the context	Characteristic + so that + context sentence frame	OCR ER J277/01 June 2025, Q1(c)
P1-06	1.5.1	Mixes up OS functions (multitasking as peripheral or user management; printer driver as memory management)	Multitasking is memory / process management; drivers are peripheral management	Wrong category matches	Card sort of OS tasks into five functions	OCR ER J277/01 June 2025, Q2(a)
P1-07	1.5.2	Explains the purpose of utility software with one example (defrag) instead of in general	Utility software maintains and optimises the computer	An example given as the purpose	Purpose first, example second	OCR ER J277/01 June 2025, Q2(b)(i)
P1-08	1.4.2	Thinks encryption stops data being intercepted or opened	Encrypted data can still be intercepted; it just cannot be understood without the key	"Encryption stops hackers getting the data"	Intercept a ciphertext message in class and try to read it	OCR ER J277/01 June 2025, Q2(b)(ii)
P1-09	1.6.1	Extended responses are one-sided (drawbacks only, or profit as the only benefit) and list points without expansion	Cover each bullet, weigh benefits and drawbacks, and expand each point	Lists of drawbacks with no 'because'	Plan with a benefit / drawback grid per bullet	OCR ER J277/01 June 2025, Q3
P1-10	1.3.1	Defines LAN vs WAN by number of devices, connection type or device ownership	The difference is geographical area and who owns the infrastructure	"A WAN has more computers"	Counter-example: a two-computer WAN	OCR ER J277/01 June 2025, Q4(a)
P1-11	1.3.1	Confuses a mesh topology with client-server (a central device)	Topology is the physical connections; client-server is how the network is managed	Mesh described with a central server	Separate 'how wired' from 'who serves'	OCR ER J277/01 June 2025, Q4(b)(i)
P1-12	1.3.1	Defines bandwidth without its effect, or gives no direction of change	Higher bandwidth means more data per second, so better performance	Definition with no effect on performance	Factor + change + effect sentence frame	OCR ER J277/01 June 2025, Q4(c)(ii)
P1-13	1.3.1	Says the cloud is less secure, or equates Wi-Fi with the internet	The issue is loss of control over security; any internet connection gives access	"No Wi-Fi so no cloud"	Discuss who controls security in each model	OCR ER J277/01 June 2025, Q4(d)

Code	Spec	Misconception	Correct idea	Shows up as	Quick fix	Evidence
P1-14	1.3.1	Names a NIC, switch, access point or cables as the device that connects a LAN to the internet	A router (or modem) connects the LAN to the internet	NIC for internet connection	Label a home network diagram	OCR ER J277/01 June 2025, Q4(e)(i)
P1-15	1.3.2	Cannot tell valid from invalid IPv4 addresses	IPv4 is four numbers, each 0 to 255	Accepts five-part addresses	Valid / invalid sorting activity	OCR ER J277/01 June 2025, Q4(e)(ii)
P1-16	1.3.1	DNS: sends the URL to the web server, returns the IP to 'the user', or re-checks the same table	The URL goes to a DNS server; if not found it is passed to another DNS server; the IP goes back to the browser	Web server doing the DNS lookup	Sequence-the-steps card activity	OCR ER J277/01 June 2025, Q4(e)(iii)
P1-17	1.6.1	Names the wrong Act for the scenario, or thinks no law applies	Personal data: Data Protection Act 2018. Unauthorised access: Computer Misuse Act 1990. Copying software or media: Copyright, Designs and Patents Act 1988	Wrong Act for data storage	Match scenarios to the right Act	OCR ER J277/01 June 2025, Q4(f)
P1-18	1.2.4	Converts to denary to add binary numbers, or mishandles carries (including the final carry)	Show the binary addition with every carry	Right answer with no binary working	Mark scheme rule: working must be binary	OCR ER J277/01 June 2025, Q5(c)
P1-19	1.2.4	Uses the wrong number of places, or the wrong direction, for a binary shift	Each left shift doubles and each right shift halves: x16 is 4 places left, divide by 4 is 2 places right	Shift of 8 places for x16	Table of shifts against powers of 2	OCR ER J277/01 June 2025, Q5(e)
P1-20	1.2.4	Adds the binary codes of several characters into one 8-bit value	Each character has its own code	One code for a word	Encode a word one character at a time	OCR ER J277/01 June 2025, Q6(a)
P1-21	1.2.4	Thinks Unicode uses fewer bits, or the same number of bits, as ASCII	Unicode uses more bits, so it can represent more characters	Reversed comparison	Compare 2^8 with 2^16 visually	OCR ER J277/01 June 2025, Q6(b)
P1-22	1.1.1	Says the MAR or PC holds data; says the accumulator holds calculations; names the ALU or CU as registers	MAR and PC hold addresses; the accumulator holds results; the ALU and CU are not registers	MAR described as storing data	Register role cards: address, data or result?	OCR ER J277/01 June 2025, Q6(c)
P1-23	1.2.1	Thinks virtual memory is extra RAM that makes the computer faster	Virtual memory is secondary storage used when RAM is full; it is slower	"Virtual memory speeds the computer up"	Demonstrate swapping slowing a machine	Setter experience
P1-24	1.2.5	Confuses lossy and lossless: thinks lossy only lowers quality, or that lossless does not reduce file size	Lossy permanently removes data; lossless reduces size and can be fully restored	Lossy explained only as quality loss	Compress and restore a text and an image file	Setter experience
P1-25	1.4.2	Thinks a firewall stops viruses	A firewall filters network traffic; anti-malware detects and removes malware	Firewall offered against an email attachment	Threat-to-defence matching	Setter experience
P1-26	1.1.2	Thinks more cores always means proportionally faster	Only tasks that can be split across cores benefit	"8 cores is twice as fast as 4"	Single-threaded vs multi-threaded analogy	Setter experience
P1-27	1.1.2	Confuses cache with storage, RAM, virtual memory or registers	Cache is small, fast memory in or near the CPU for frequently used instructions and data	"Cache saves your files"	Memory hierarchy diagram	Setter experience

Code	Spec	Misconception	Correct idea	Shows up as	Quick fix	Evidence
P1-28	1.2.3	Makes bit and byte conversion errors (forgets to divide or multiply by 8)	Bits / 8 = bytes; bytes x 8 = bits	File size 8 times too large	Unit ladder with x8 between bit and byte	Setter experience
P1-29	1.4.1	Mixes up types of attack: phishing, brute force, social engineering and hacking	Phishing is fake messages; brute force is automated guessing; social engineering manipulates people	Phishing named for a phone call	Scenario sort by attack type	Setter experience
P1-30	1.2.4	Confuses sample rate with sample resolution (bit depth)	Sample rate is samples taken per second; bit depth is the number of bits used for each sample	"More samples per second" given as the effect of a higher bit depth	Two-column table: per second (rate) vs per sample (depth)	Setter experience
P1-31	1.2.4	Confuses the number of values n bits can hold with the largest value	n bits hold 2^n different values, from 0 to 2^n - 1	256 given as the largest 8-bit number	Count up from 0 on a 3-bit table and compare the count with the top value	Setter experience